PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
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PCT

NOTIFICATION OF TRANSMITTAL OF INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)
(PCT Rule 71.1)

Date of mailing (day/month/year)	17 May 2006 (17.05.2006)
Applicant's or agent's file reference: 232	IMPORTANT NOTIFICATION

International application No.	International filing date (day/month/year)	Priority Date (day/month/year)
PCT/KR 2004/003287	14 December 2004 (14.12.2004)	18 February 2004 (18.02.2004)

Applicant
SOGANG UNIVERSITY CORPORATION

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the eleceted Offices.

3. Where required by any of the elected Offices, the Interational Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the eleceted Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/AT	Authorized officer
Austrian Patent Office Dresdner Straße 87 A-1200 Vienna/Austria FAX No. +43 1 53424-200	HOFBAUER Telephone No. +43 1 53424 - 225

Form PCT/IPEA/416 (January 2004)

Express Mail No. EV746686332US

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
232		
International application No.	International filing date (*day/month/year*)	Priority Date (*day/month/year*)
PCT/KR 2004/003287	14 December 2004 (14.12.2004)	18 February 2004 (18.02.2004)

International Patent Classification (IPC) or national classification and IPC

IPC[8]: ***H01B 3/30*** (2006.01)

Applicant

SOGANG UNIVERSITY CORPORATION

1. This international preliminary examination report has been prepared by this International Preliminary Examination Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☐ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of _____ sheets.

3. This report contains indications relating to the following items:

- I. ☒ Basis of the opinion
- II. ☐ Priority
- III. ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV. ☐ Lack of unity of invention
- V. ☒ Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI. ☐ Certain documents cited
- VII. ☐ Certain defects in the international application
- VIII. ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
14 September 2005 (14.09.2005)	9 May 2006 (09.05.2006)
Name and mailing address of the IPEA AT Austrian Patent Office Dresdner Straße 87 A-1200 Vienna	Authorized officer SCHLECHTER B.
Facsimile No. 1 53424 200	Telephone No. 1 53424 448

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/KR 2004/003287

I. Basis of the report

1. With regard to the **elements** of the international application:*

☒ the international application as originally filed

☐ the description:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____, filed with the letter of _____.

☐ the claims:
pages _____ , as originally filed
pages _____ , as amended (together with any statement) under Article 19
pages _____ , filed with the demand
pages _____, filed with the letter of _____.

☐ the drawings:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____.

☐ the sequence listing part of the description:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____.

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in printed form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____.

☐ the claims, Nos. _____.

☐ the drawings, sheets fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

** Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

*** Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/KR 2004/003287

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-10	YES
	Claims	----	NO
Inventive step (IS)	Claims	1-10	YES
	Claims	----	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims	----	NO

Citations and explanations (Rule 70.7)

The following documents are cited in the Search Report:

D1: US 2003055134 A1
D2: US2003065123 A1
D3: US 6632748 B
D4: KR 200324002 A

D1 and its family member D3 disclose a composition for preparing substances having nano-pores comprising
cyclodextrin derivative;
thermo-stable organic or inorganic matrix precursor; and
solvent for dissolving both cyclodextrin derivative and the matrix precursor.

D2 and its family member D4 teach the preparation of a siloxane-based resin by hydrolyzing and polycondensing cyclic siloxane compound and cage-shaped siloxane compound, optionally with silane compound(s) substituted with hydrolyzable group(s) at silicon.

The subject matter of the present application is concerned with reactive nanoparticular porogen based on cyclodextrin derivative to be used as a porogen, the derivate especially comprising C1-6 trialkoxysilane groups.
The cited documents disclose cyclodextrin derivative as porogen, however remain silent concerning C1-6 trialkoxysilane groups.
Thus, claims 1 3, 4 6 and 10 can be considered novel and inventive.
Residual claims 2, 5 and 7-9 are dependent on independent claims, respectively.
Industrial applicability is given.

PCT/KR2004/003287

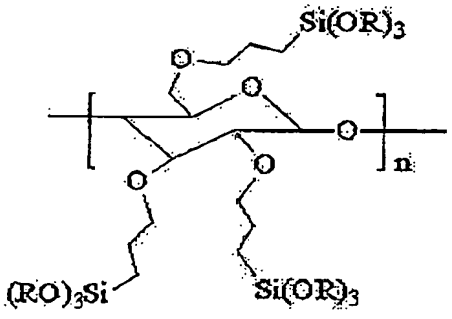
14 SEPTEMBER 2005

REACTIVE CYCLODEXTRIN DERIVATIVES AS PORE-FORMING TEMPLATES, AND LOW DIELECTRIC MATERIALS PREPARED BY USING THE SAME

Technical Field

This invention relates to reactive nanoparticular porogen based on cyclodextrin derivatives useful as a pore-forming template (porogen) and a low dielectric matrix, with excellent mechanical properties and uniformly distributed nanopores, manufactured by sol-gel reaction of the above reactive cyclodextrin derivatives themselves. Further, this invention also relates to an ultralow dielectric material with uniformly distributed nanopores, a relatively high porosity of 51% and a relatively low dielectric constant of 1.6, manufactured by blending of the conventional organic or inorganic silicate precursor by using the above reactive cyclodextrin as a porogen.

Background of Invention



(1)

In the above formula 1, R represents the same or different C_{1-6} alkyl groups, respectively, wherein n is an integer of 6 to 12.

- Amended Sheet -

Comparative Example 2

Low dielectric thin film was manufactured using cyclicsilsesquioxane (CSSQ), a low dielectric film manufactured by Samsung Advanced Institute of Technology (Korea) and also disclosed in Korea Laid-Open Patent Application No. 2002-75720, was used as matrix and heptakis(2,3,6-tri-O-methyl)-β-cyclodextrin) (tCD) was used as a porogen. The experimental method and its physical properties of the comparative example 2 are cited from the above-mentioned Korean patent application.

Further, the physical properties of the thin films manufactured in example 1, comparative examples 1 and 2, respectively, were measured by the method described in the following experimental example, and the results are shown in Table 1, and Figs. 2 and 3, respectively.

Experimental Example: Measurement of Physical Properties of Thin Films

The refractive index and thickness of thin films were measured at 632.8 nm by using ellipsometer (L166C, Gaertner Scientific Corp.). The porosities of the thin films were calculated by using Lorentz-Lorentz equation, shown in the following equation 1.

Equation 1

$$\frac{(n_s^2-1)}{(n_s^2+1)} = (1-p)\frac{(n_r^2-1)}{(n_r^2+1)}$$

In the above equation 1, n_s or n_r indicates porous or non-porous refractive indices, respectively and p indicates porosity.